

# Debian GNU/Linux Setup Guide

For ThinkPad P53, P73

*\*\*\* Official support of Debian 10.0 and later.*



## Section 1 – BIOS Setup and Pre-Installation Steps

The first step before installing Linux is to make sure the system BIOS is setup correctly.

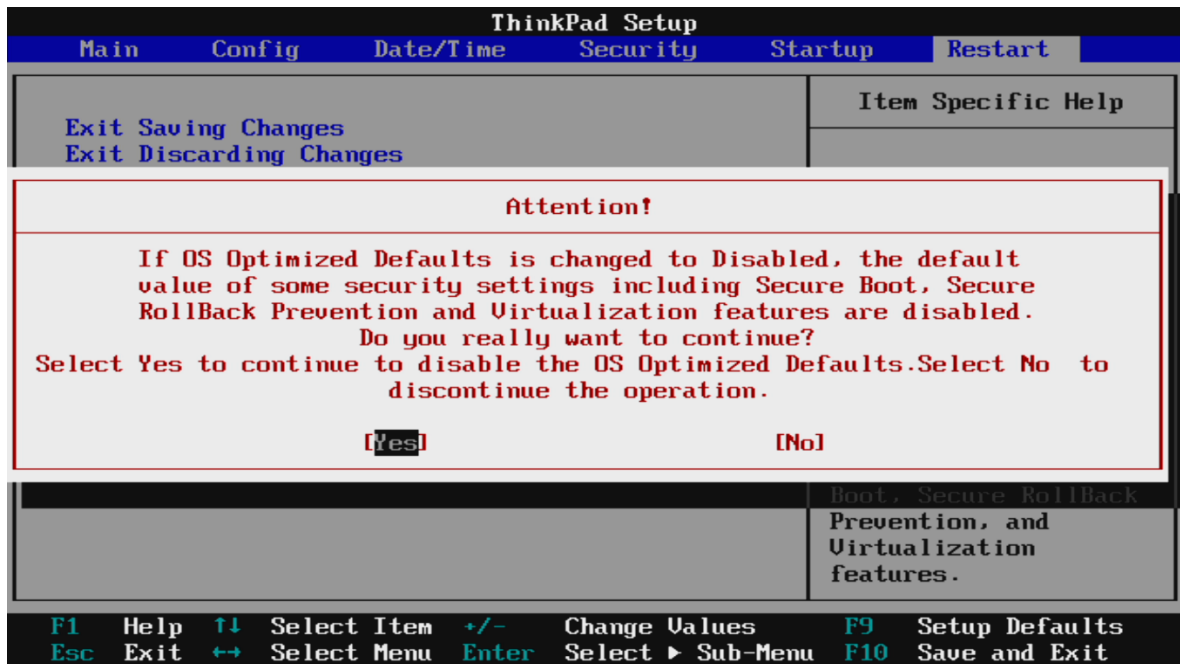
- Boot into BIOS by pressing the function F1 key at the “Lenovo” splash screen.



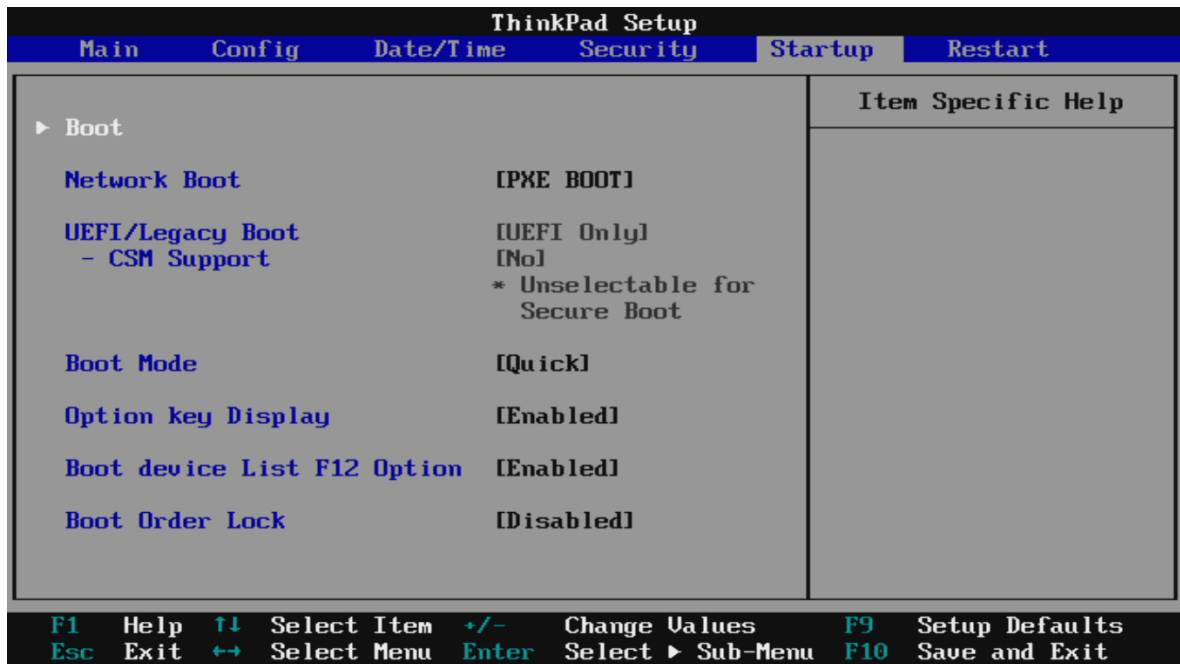
- Tab over to the 'Restart' menu tab and set "OS Optimized Defaults" to "Disabled".



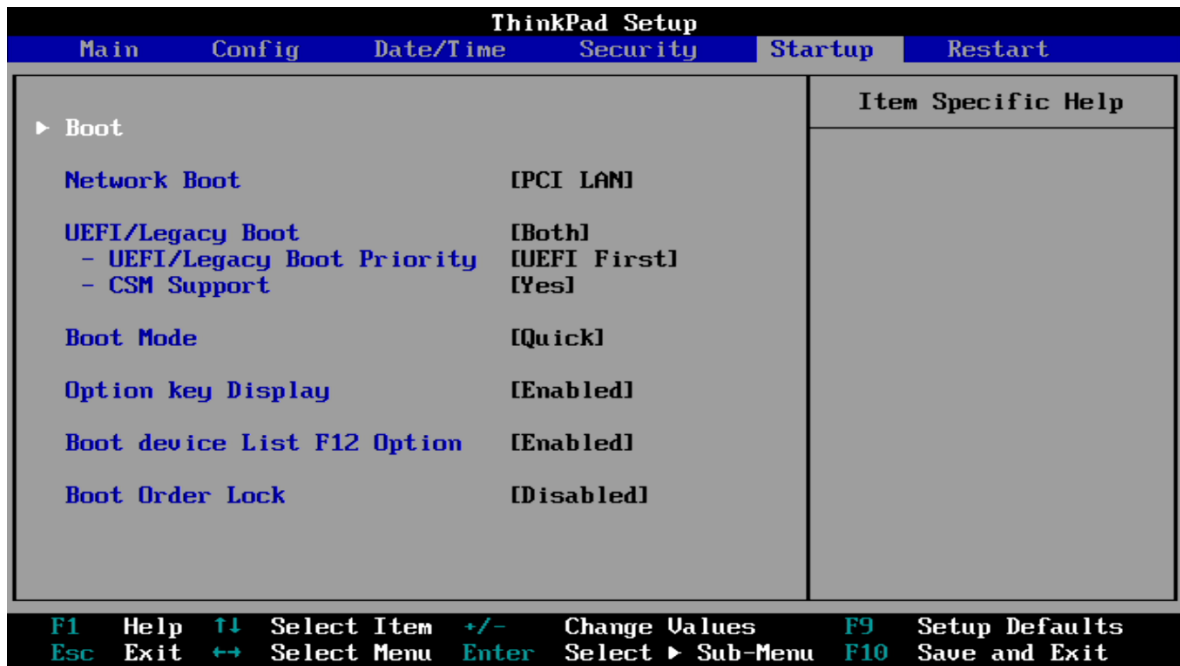
- Switching the “OS Optimized Defaults” settings may give a warning message. Select “Yes” to continue to disable OS Optimized Defaults.



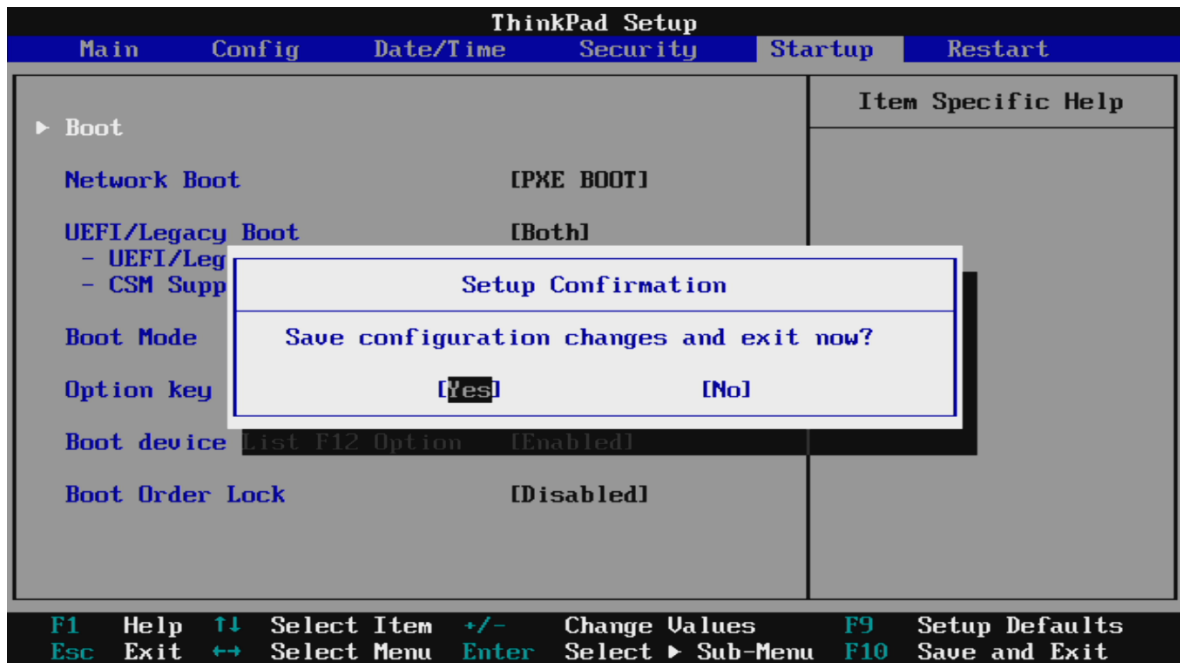
- Tab over to the “Startup” menu tab.



- Pressing F9 function key will allow Legacy and UEFI bootable devices by setting “UEFI/Legacy Boot” to “Both”; otherwise, it will be an unchangeable setting to “UEFI only”.



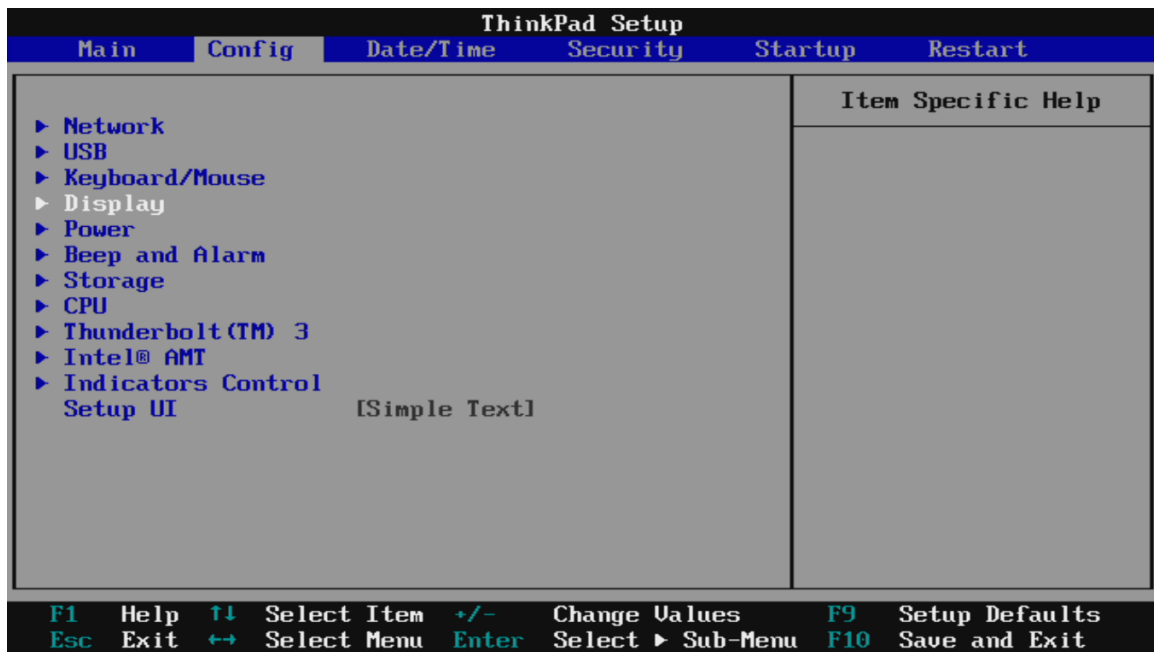
- Press function F10 key to save and exit BIOS setup.



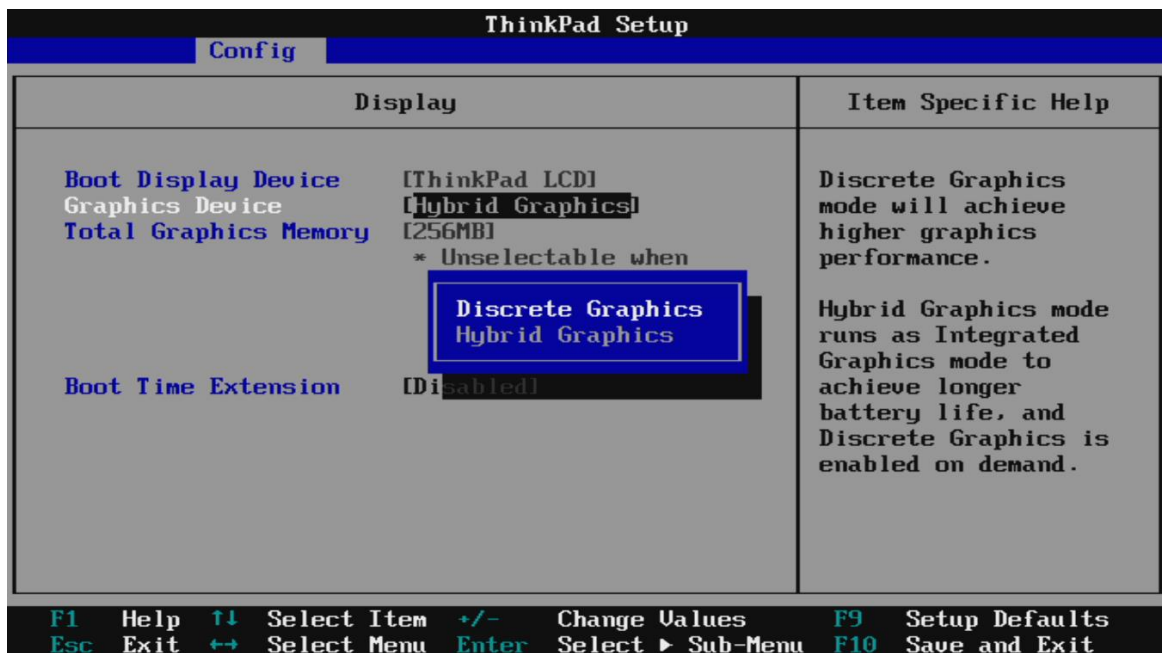
## Section 2 – Discrete vs Hybrid Graphics

The Thinkpad P53 and P73 offer both Nvidia and Intel graphics. To run exclusively Nvidia graphics, use the discrete graphics mode highlighted below.

- Boot into BIOS, tab over to the “Config” menu option, and select the “Display” option.



- By default, the “Graphics Device” will likely be set to “Hybrid Graphics”. To run exclusively Nvidia graphics, set the “Graphics Device” to “Discrete Graphics”.



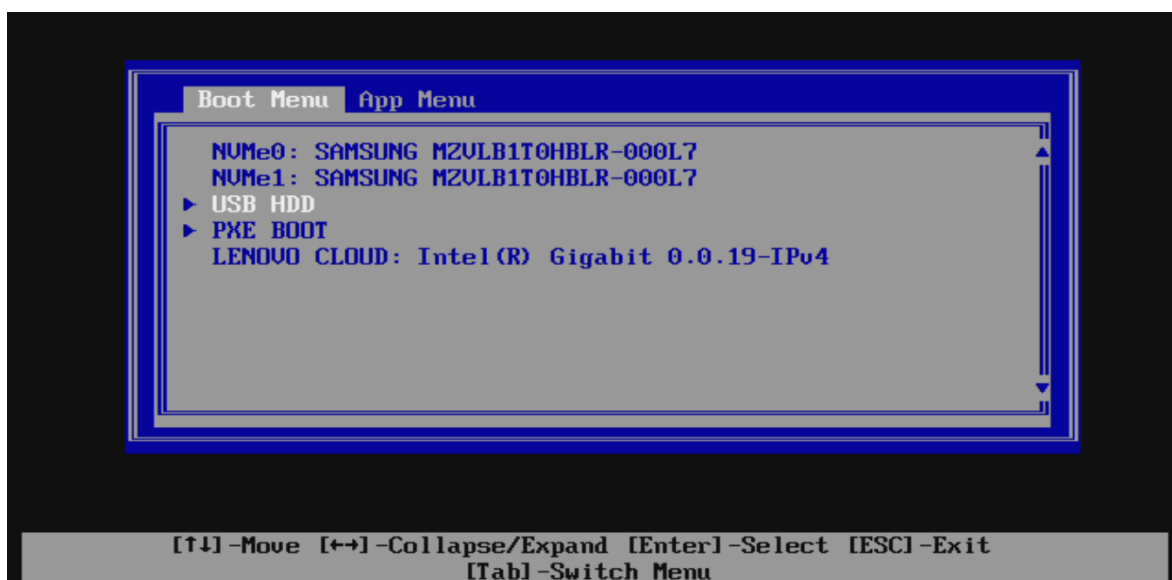
## Section 3 – Installing Debian 10.x

Please refer to the following instructions and screenshots on how to install Debian 10 on the Lenovo Thinkpad P53 and P73.

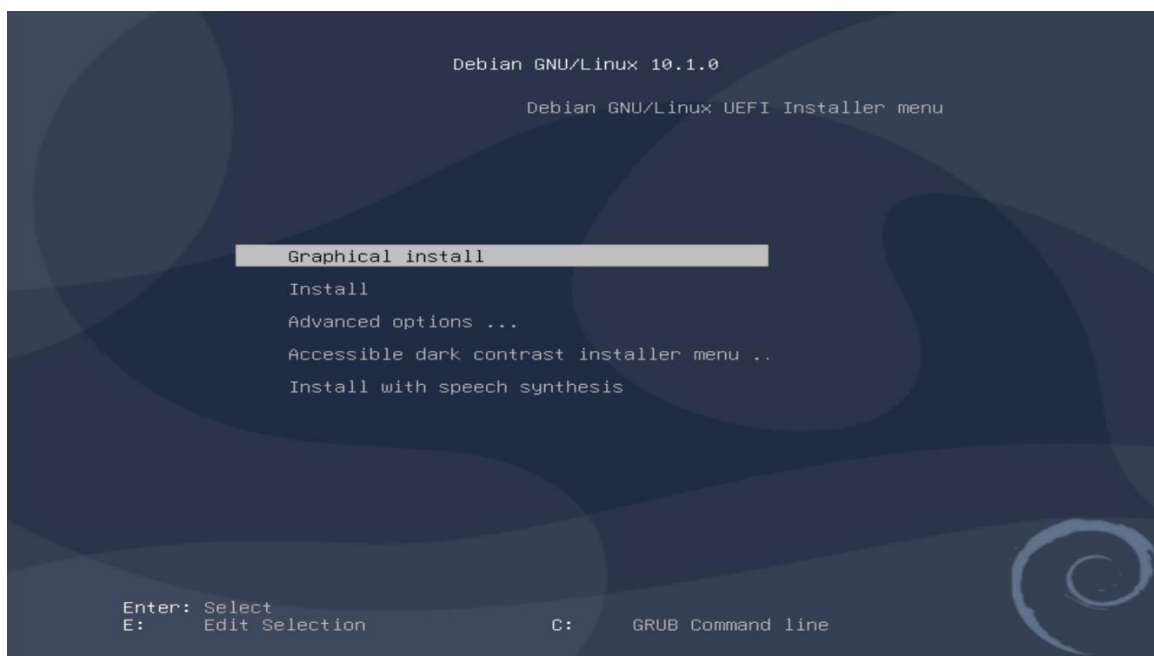
- Insert the Debian 10 installation media (either through USB or CD/DVD).
- Power on the system and press the F12 function key whenever the following Lenovo splash screen appears.



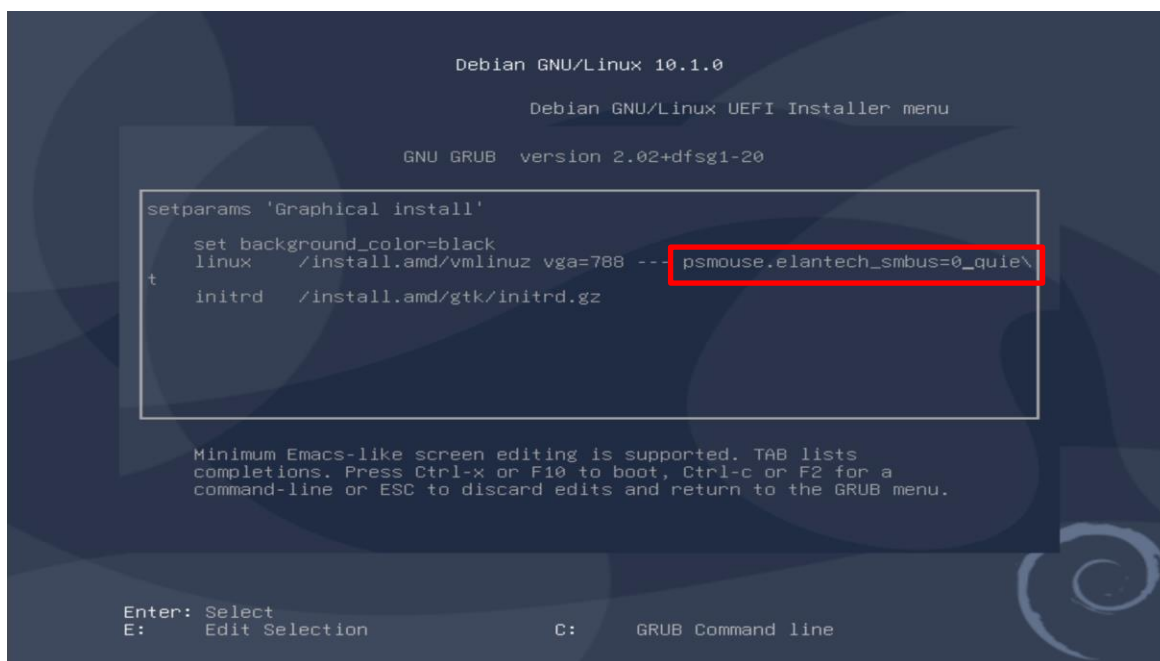
- Select the Linux bootable installation media from the F12 boot menu list.



- Highlight “Graphical install” from the Debian boot menu and press ‘E’ to edit.



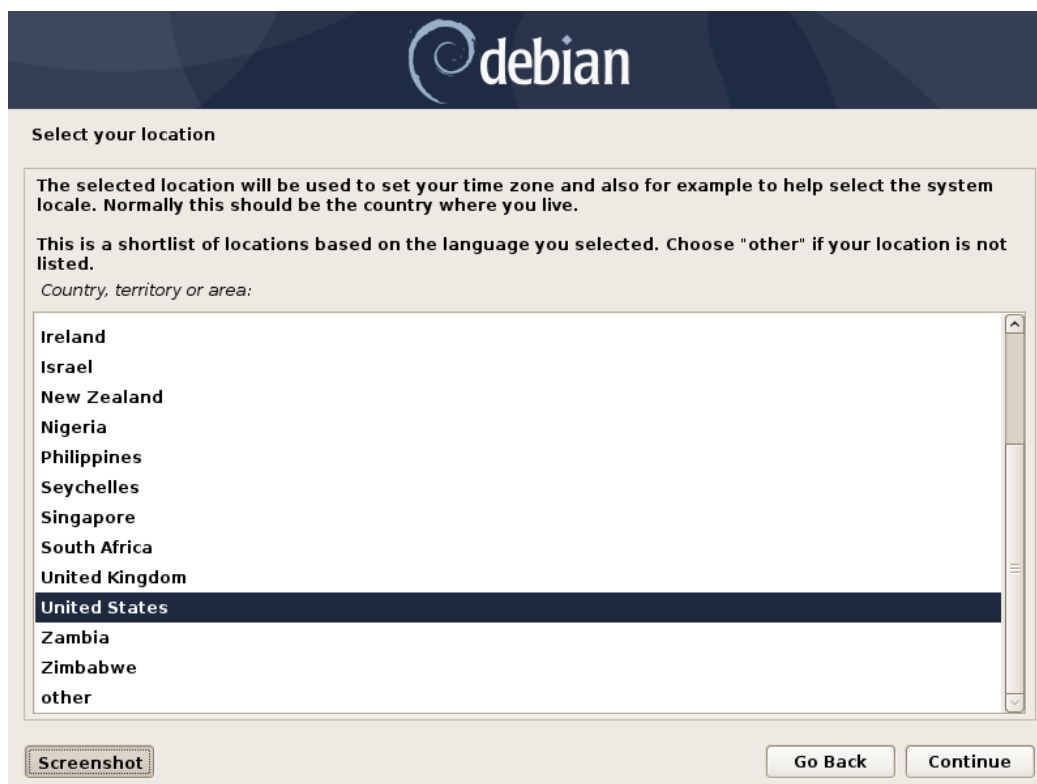
- Add the following line, “**psmouse.elantech\_smbus=0**” before “quiet”, then press “Ctrl+x”.




- Select the appropriate language and “Continue”.



- Continue to personalize options.








### Configure the keyboard

Keymap to use:

- American English
- Albanian
- Arabic
- Asturian
- Bangladesh
- Belarusian
- Bengali
- Belgian
- Bosnian
- Brazilian
- British English
- Bulgarian (BDS layout)
- Bulgarian (phonetic layout)
- Burmese
- Canadian French
- Canadian Multilingual
- Catalan

- Set the desired root password



### Set up users and passwords

You need to set a password for 'root', the system administrative account. A malicious or unqualified user with root access can have disastrous results, so you should take care to choose a root password that is not easy to guess. It should not be a word found in dictionaries, or a word that could be easily associated with you.

A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.

The root user should not have an empty password. If you leave this empty, the root account will be disabled and the system's initial user account will be given the power to become root using the "sudo" command.

Note that you will not be able to see the password as you type it.

Root password:

●●●●●●

☐ Show Password in Clear

Please enter the same root password again to verify that you have typed it correctly.

Re-enter password to verify:

●●●●●●

☐ Show Password in Clear

- Set the desired user name.



**Set up users and passwords**

A user account will be created for you to use instead of the root account for non-administrative activities.

Please enter the real name of this user. This information will be used for instance as default origin for emails sent by this user as well as any program which displays or uses the user's real name. Your full name is a reasonable choice.

Full name for the new user:

**Screenshot** **Go Back** **Continue**

- Set the password for the user.



**Set up users and passwords**

A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.

Choose a password for the new user:

☐ Show Password in Clear

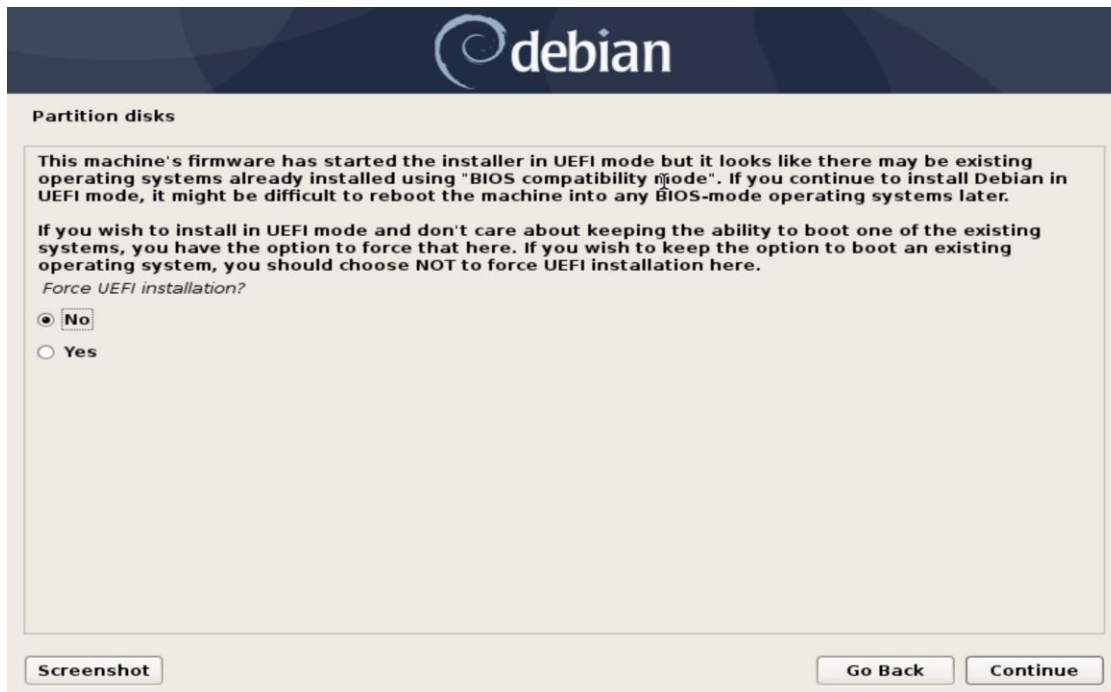
Please enter the same user password again to verify you have typed it correctly.

Re-enter password to verify:

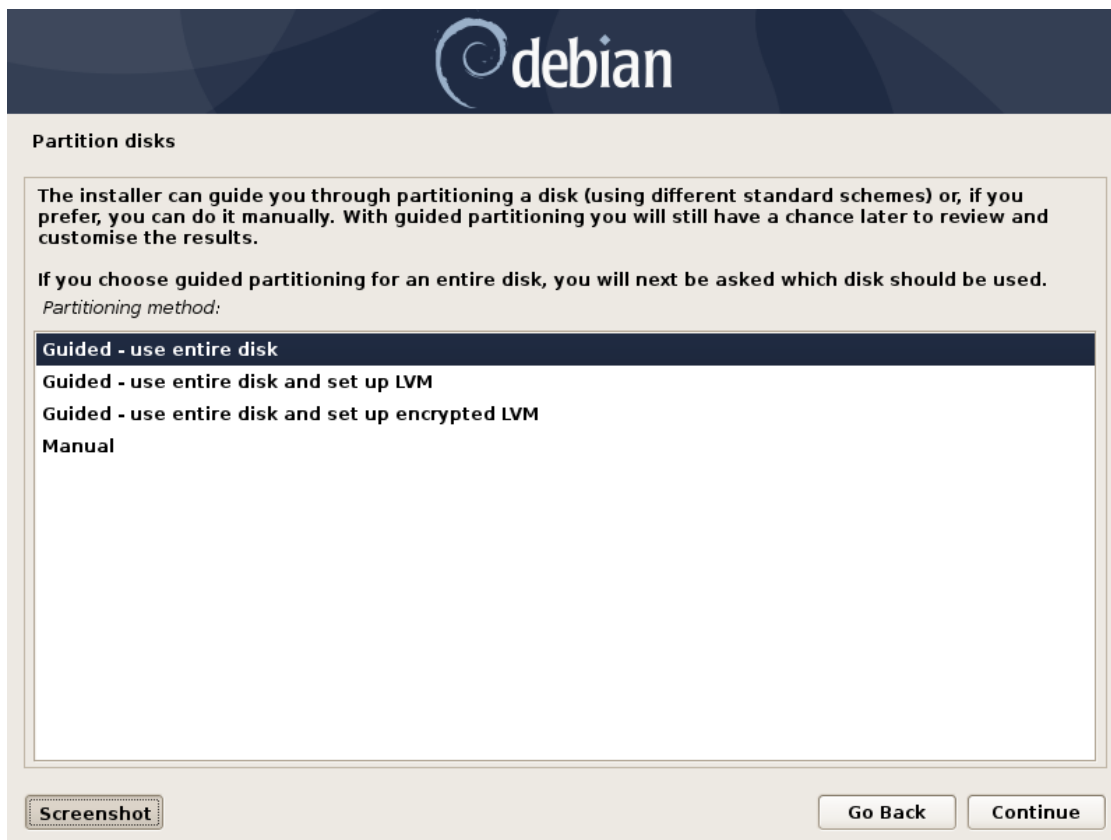
☐ Show Password in Clear

**Screenshot** **Go Back** **Continue**

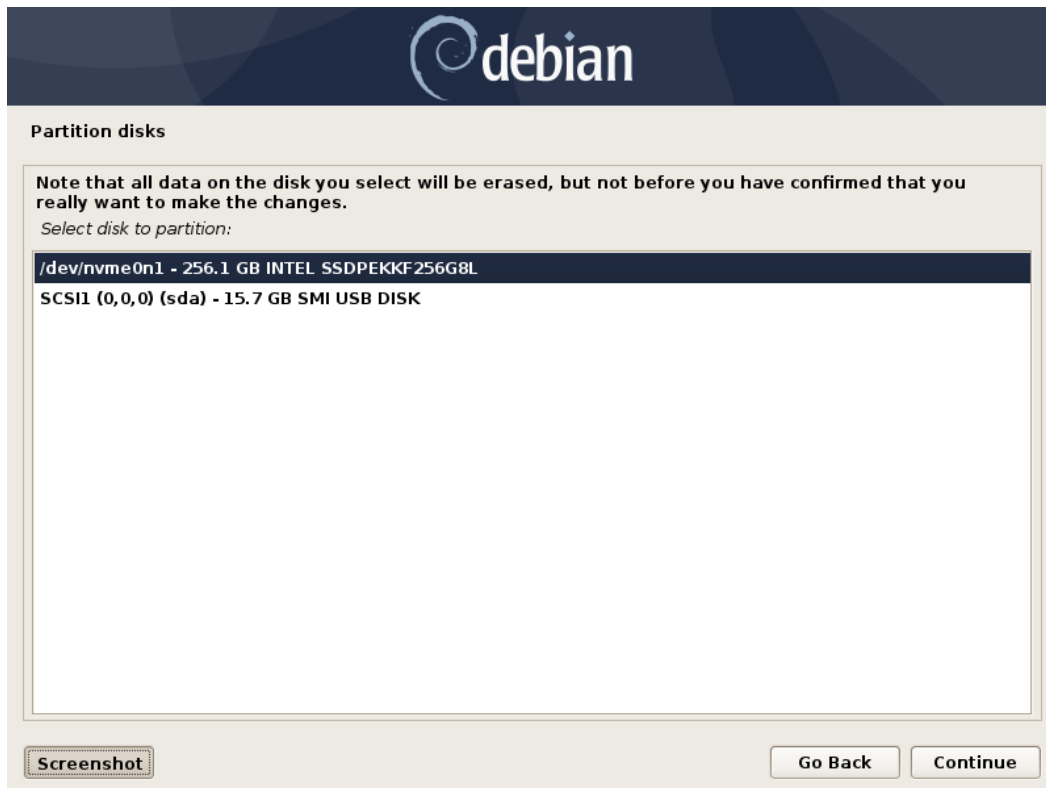
- Select “No” when asked to force UEFI Installation.



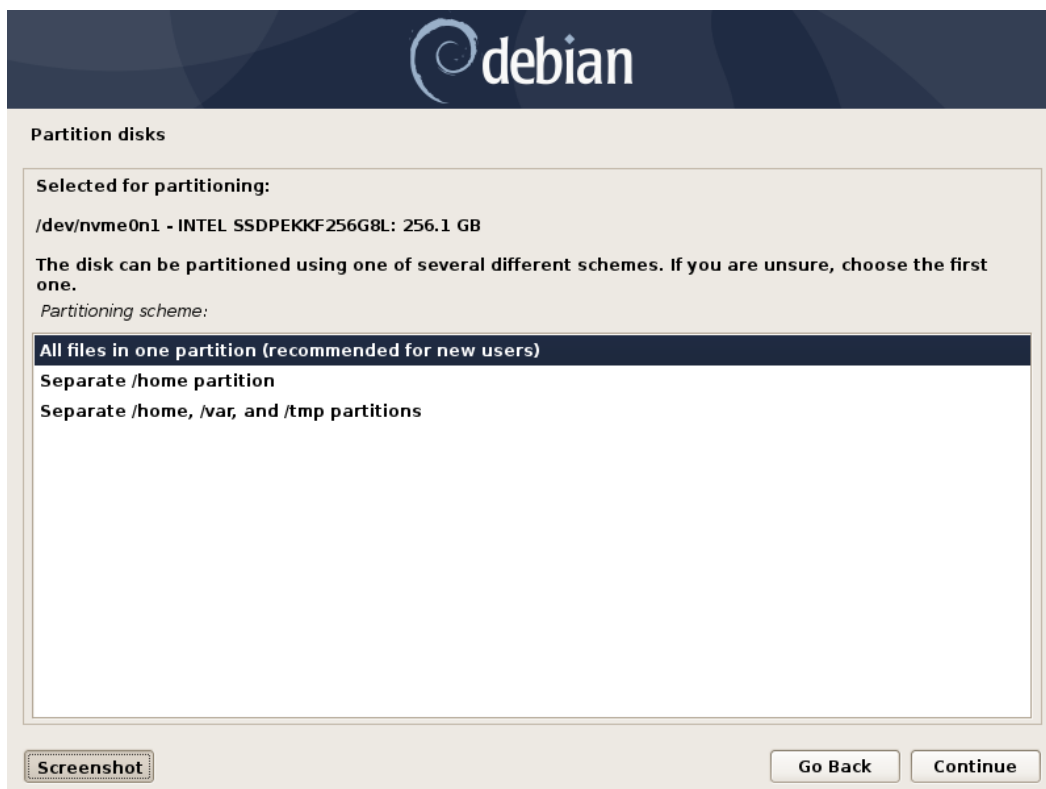
- Choose “Guided – use entire disk” partitioning method.



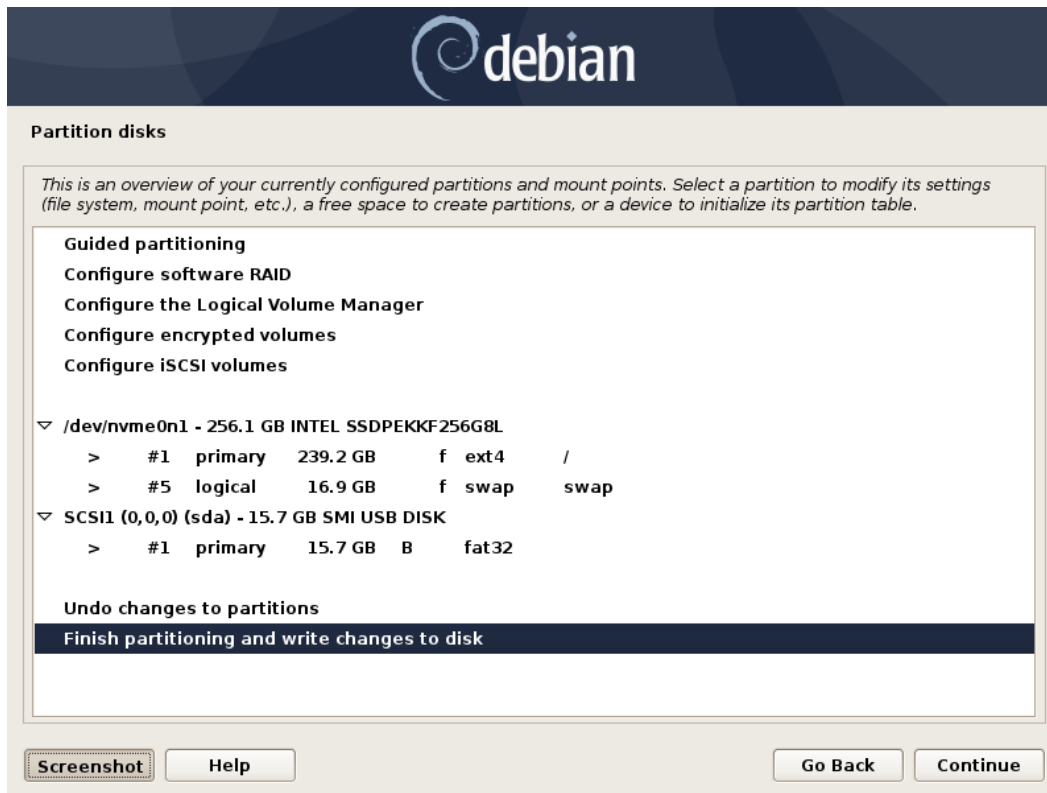
- Select the storage device on which to install the operating system.



- Chose "All files in one partition..." as the partitioning scheme.



- Choose to “Finish partitioning and write changes to disk”



- Next select “Yes” to write the changes to the disk.



- Choose “No” when asked to use a network mirror.



- Choose desired software to install.



- Choose the desired default display manager.



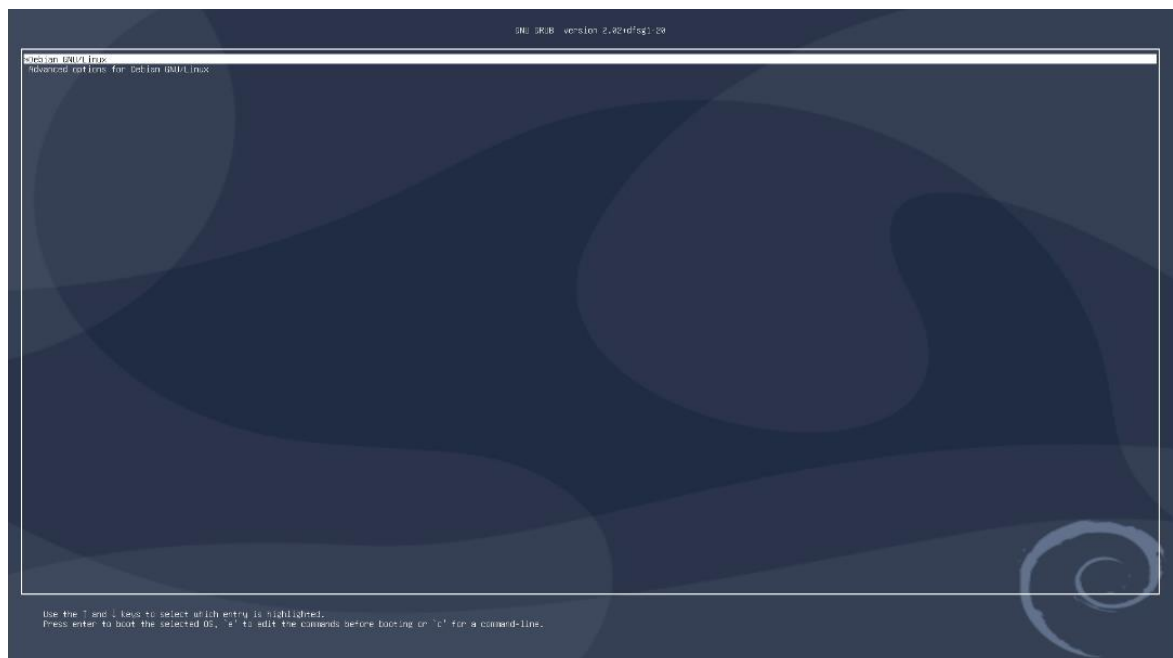
- Select “Yes” to install the GRUB boot loader to the master boot record.



- Select the boot disk for boot loader installation.



- After reboot highlight “Debian GNU/Linux” from the GRUB boot options and press ‘e’

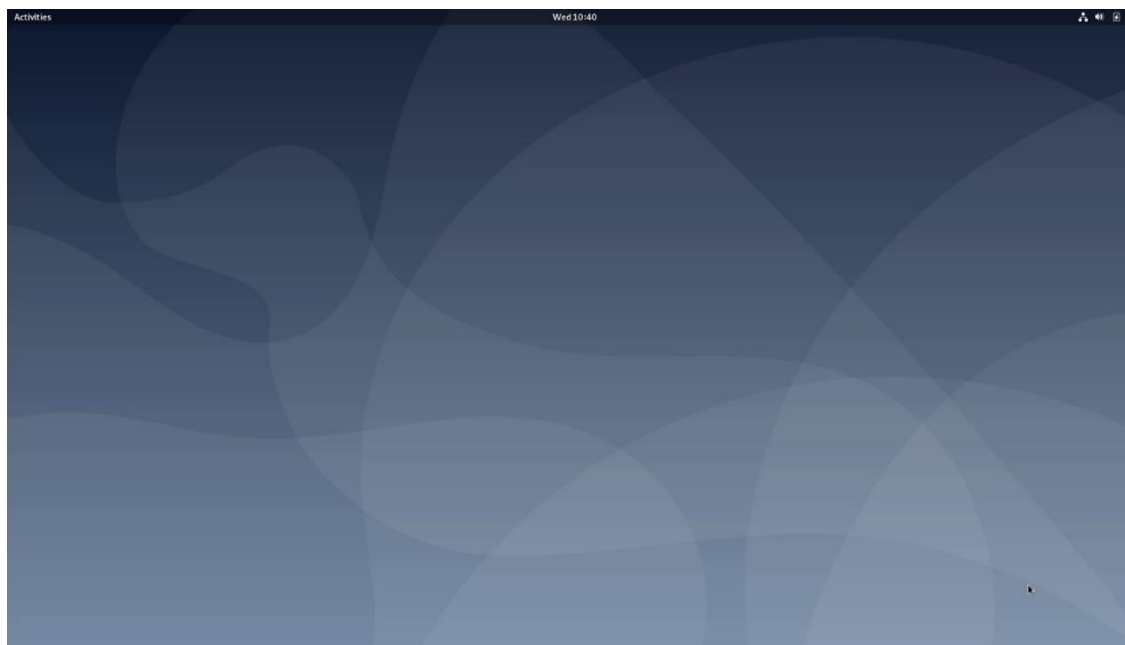




- Add “psmouse.elantech\_smbus=0” before “quiet”, then press “ctrl+x”.

[illegible]

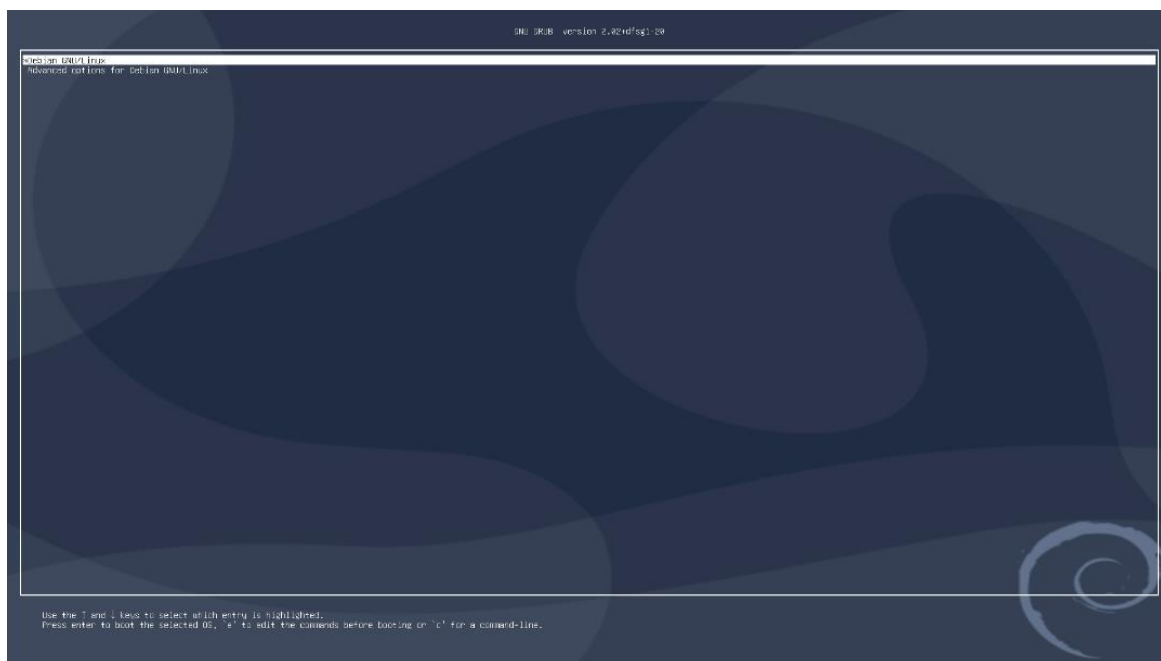
- Log in to the Debian desktop.



## Section 4 – TrackPoint and Touchpad Workaround

The TrackPoint and touchpad driver is not native to the Debian 10 kernel, so users will not be able to use the TrackPoint or touchpad by default. The following method can be used to enable these devices on a ThinkPad P53 and P73.

**Step 1:** Upon startup, highlight “Debian GNU/Linux” from the GRUB boot options and press ‘e’.



**Step 2:** Add “psmouse.elantech\_smbus=0” before “quiet”, then press “ctrl+x”.

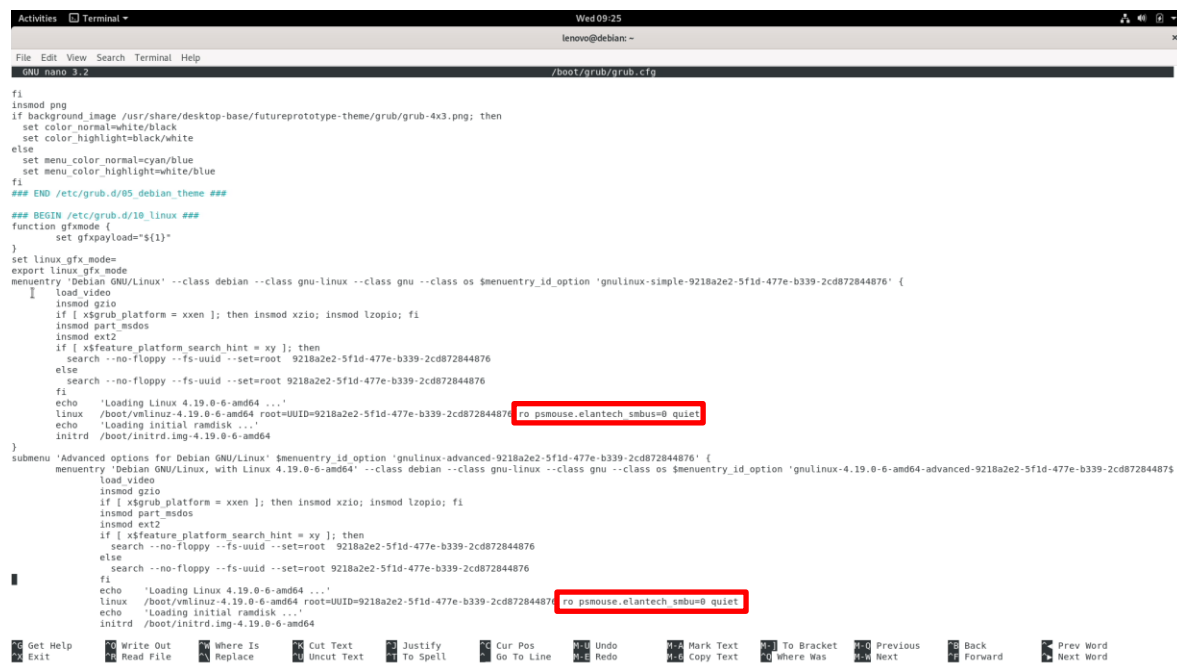


**Step 3:** After booting into Debian edit the grub.cfg file.

# su -

# nano /boot/grub/grub.cfg

- Add the line “psmouse.elantech\_smbus=0” at these locations.



```

GNU nano 3.2 /boot/grub/grub.cfg

fi
insmod png
if background_image /usr/share/desktop-base/futureprototype-theme/grub/grub-4x3.png; then
  set color normal=white/black
  set color highlight=black/white
else
  set menu_color_normal=cyan/blue
  set menu_color_highlight=white/blue
fi
### END /etc/grub.d/05_debian_theme ###

### BEGIN /etc/grub.d/10_linux ###
function gfxmode {
  set gfxpayload=${1}
}
set linux_gfx_mode=
export linux_gfx_mode
menueentry 'Debian GNU/Linux' --class debian --class gnu-linux --class gnu --class os $menuentry_id_option 'gnulinux-simple-9218a2e2-5f1d-477e-b339-2cd872844876' {
  load_video
  insmod gzio
  if [ x$grub_platform = xxen ]; then insmod xzio; insmod lzopio; fi
  insmod part_msdos
  insmod ext2
  if [ x$feature_platform_search_hint = xy ]; then
    search --no-floppy --fs-uuid --set=root 9218a2e2-5f1d-477e-b339-2cd872844876
  else
    search --no-floppy --fs-uuid --set=root 9218a2e2-5f1d-477e-b339-2cd872844876
  fi
  echo 'Loading Linux 4.19.0-6-amd64 ...'
  linux /boot/vmlinuz-4.19.0-6-amd64 root=UUID=9218a2e2-5f1d-477e-b339-2cd872844876 ro psmouse.elantech_smbus=0 quiet
  echo 'Loading initial ramdisk ...'
  initrd /boot/initrd.img-4.19.0-6-amd64
}
submenu 'Advanced options for Debian GNU/Linux' $menuentry_id_option 'gnulinux-advanced-9218a2e2-5f1d-477e-b339-2cd872844876' {
  menueentry 'Debian GNU/Linux, with Linux 4.19.0-6-amd64' --class debian --class gnu-linux --class gnu --class os $menuentry_id_option 'gnulinux-4.19.0-6-amd64-advanced-9218a2e2-5f1d-477e-b339-2cd872844876' {
    load_video
    insmod gzio
    if [ x$grub_platform = xxen ]; then insmod xzio; insmod lzopio; fi
    insmod part_msdos
    insmod ext2
    if [ x$feature_platform_search_hint = xy ]; then
      search --no-floppy --fs-uuid --set=root 9218a2e2-5f1d-477e-b339-2cd872844876
    else
      search --no-floppy --fs-uuid --set=root 9218a2e2-5f1d-477e-b339-2cd872844876
    fi
    echo 'Loading Linux 4.19.0-6-amd64 ...'
    linux /boot/vmlinuz-4.19.0-6-amd64 root=UUID=9218a2e2-5f1d-477e-b339-2cd872844876 ro psmouse.elantech_smbus=0 quiet
    echo 'Loading initial ramdisk ...'
    initrd /boot/initrd.img-4.19.0-6-amd64
  }
}

```

- Press “ctrl + x” and save the file.

**Step 4:** Reboot the system and now the TrackPoint and touchpad should work as expected.

## Section 5 – Wireless Network Driver

The wireless network driver is not native to the Debian 10 kernel, so users will not be able to connect to wireless networks by default. The following methods can be used to enable the wireless network on a ThinkPad P53 and P73.

**Option 1:** Update the *iwlwifi* module:

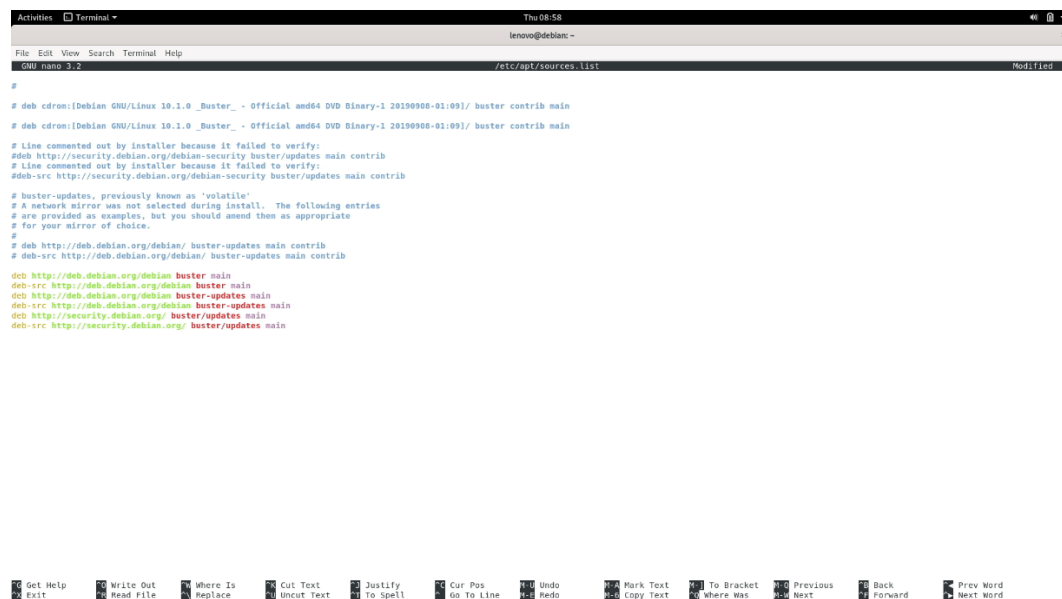
**Step 1:** Make sure you are connected to a network via a wired LAN connection

**Step 2:** Update the sources as follows:

# su -

# nano /etc/apt/sources.list

- Comment out the “deb cdrom:...” source
- ```
deb http://deb.debian.org/debian buster main
deb-src http://deb.debian.org/debian buster main
deb http://deb.debian.org/debian buster-updates main
deb-src http://deb.debian.org/debian buster-updates main
deb http://security.debian.org/ buster/updates main
deb-src http://security.debian.org/ buster/updates main
```



```

# deb cdrom:[Debian GNU/Linux 10.1.0 _Buster_ - Official amd64 DVD Binary-1 20190906-01:09]/ buster contrib main
# deb cdrom:[Debian GNU/Linux 10.1.0 _Buster_ - Official amd64 DVD Binary-1 20190906-01:09]/ buster contrib main
# Line commented out by installer because it failed to verify:
#deb http://security.debian.org/debian-security buster/updates main contrib
# Line commented out by installer because it failed to verify:
#deb-src http://security.debian.org/debian-security buster/updates main contrib
# buster-updates, previously known as 'volatile'
# A network mirror was not selected during install. The following entries
# are provided as examples, but you should amend them as appropriate
# for your mirror of choice.
#
# deb http://deb.debian.org/debian/ buster-updates main contrib
# deb-src http://deb.debian.org/debian/ buster-updates main contrib
deb http://deb.debian.org/debian buster main
deb-src http://deb.debian.org/debian buster main
deb http://deb.debian.org/debian buster-updates main
deb-src http://deb.debian.org/debian buster-updates main
deb http://security.debian.org/ buster/updates main
deb-src http://security.debian.org/ buster/updates main

```

**Step 3:** Update the sources.list file

```
# apt-get update
```

**Step 4:** Install the development tools package

```
# apt install git build-essential
```

**Step 5:** Install linux kernel headers package

```
# apt install linux-headers-$(uname -r)
```

**Step 6:** Install the *iwlwifi* package.

```
# git clone https://git.kernel.org/pub/scm/linux/kernel/git/iwlwifi/backport-iwlwifi.git
# cd backport-iwlwifi/
# make defconfig-iwlwifi-public
# sed -i 's/CPTCFG_IWLMVM_VENDOR_CMDS=y/# CPTCFG_IWLMVM_VENDOR_CMDS is not set/' .config
# make -j4
# make install
```

**Step 7:** Install the Intel Wireless Driver

```
# wget https://wireless.wiki.kernel.org/\_media/en/users/drivers/iwlwifi/iwlwifi-cc-46.3cfab8da.0.tgz
# tar xzf iwlwifi*
# cd iwlwifi*/
# cp iwlwifi*/lib/firmware/
# cp LICENSE*/lib/firmware/
# modprobe iwlwifi
# reboot now
```

- When the system boots back up the wireless network should be enabled.

**Option 2:** Update the Linux kernel to 5.0:

```
# apt install linux-oem-osp1 linux-firmware
```

---

## Section 6 – Installing the Nvidia Graphics Driver

In order to get optimal performance out of the Nvidia GPU, it's a good idea to install the Nvidia graphics driver.

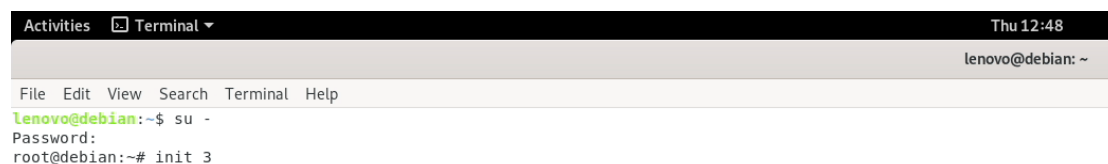
To install the latest Nvidia graphics driver, follow the steps below:

**Step 1:** Download the latest Nvidia graphics driver for the appropriate Nvidia GPU from <https://www.nvidia.com/Download/Find.aspx?lang=en-us>.

**Step 2:** Open a terminal window and stop x-windows as root.

```
# su -
```

```
# init 3
```



```
Activities Terminal Thu 12:48
lenovo@debian: ~
File Edit View Search Terminal Help
lenovo@debian:~$ su -
Password:
root@debian:~# init 3
```

**Step 3:** Login and browse to the directory location to where the Nvidia driver installer is.

```
# cd /home/(username)/Downloads/
```

```
Debian GNU/Linux 10 debian tty1
debian login: lenovo
Password:
Last login: Wed Dec 18 13:53:01 EST 2019 on tty1
Linux debian 4.19.0-6-amd64 #1 SMP Debian 4.19.67-2 (2019-08-28) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
lenovo@debian:~$ cd /home/lenovo/Downloads
lenovo@debian:~/Downloads$ _
```

**Step 4:** Make the Nvidia installer an executable.

```
# chmod +x NVIDIA-Linux-x86-64-*
```

```
Debian GNU/Linux 10 debian tty1

debian login: lenovo
Password:
Last login: Wed Dec 18 13:53:01 EST 2019 on tty1
Linux debian 4.19.0-6-amd64 #1 SMP Debian 4.19.67-2 (2019-08-28) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
lenovo@debian:~$ cd /home/lenovo/Downloads
lenovo@debian:~/Downloads$ chmod +x NVIDIA-Linux-x86_64-440.44.run
lenovo@debian:~/Downloads$ _
```

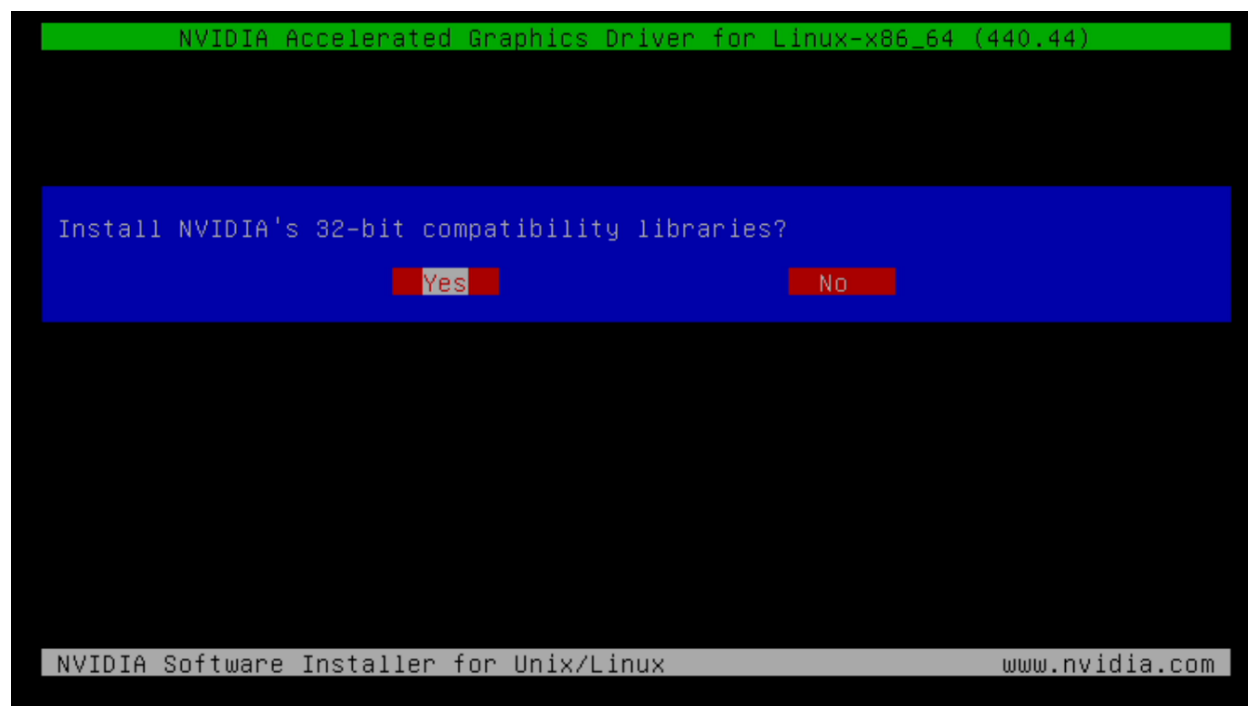
**Step 5:** Run the Nvidia driver executable as root.

```
# su
```

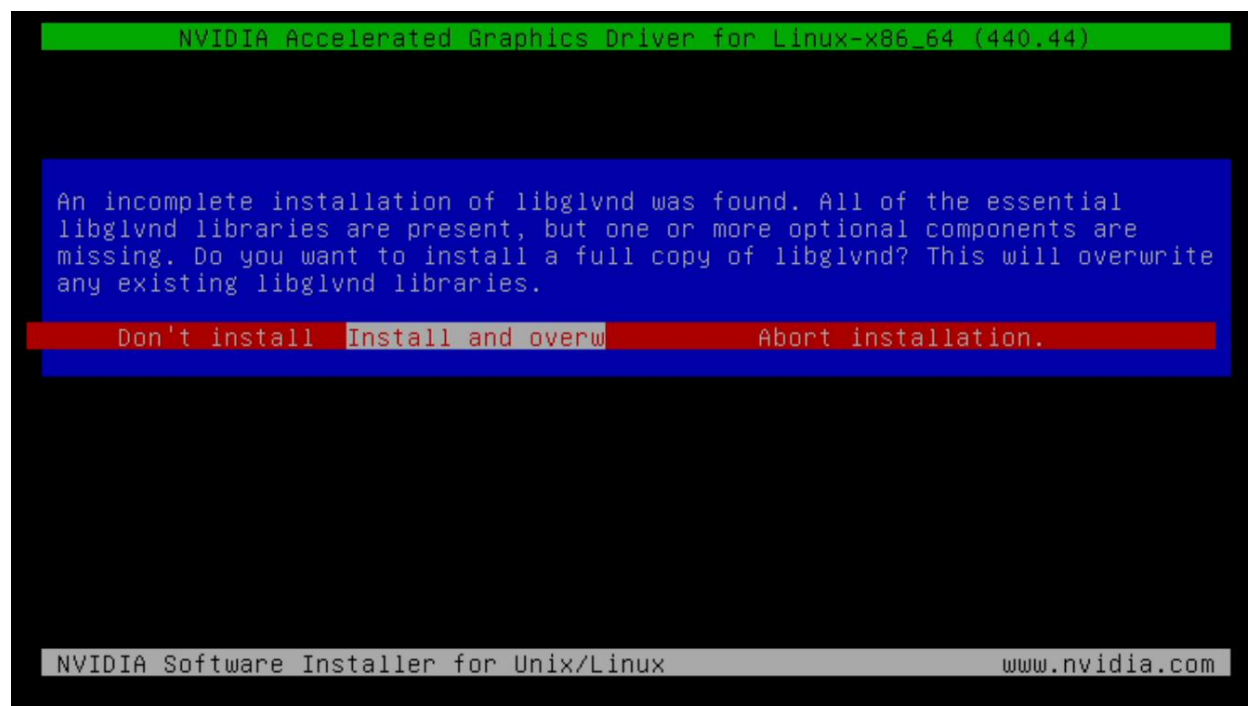
```
# ./NVIDIA-Linux-x86_64*
```

```
lenovo@debian:~/Downloads$ su
Password:
root@debian:/home/lenovo/Downloads# ./NVIDIA-Linux-x86_64-440.44.run _
```

**Step 6:** Optional: Choose whether to install the 32-bit compatibility libraries.

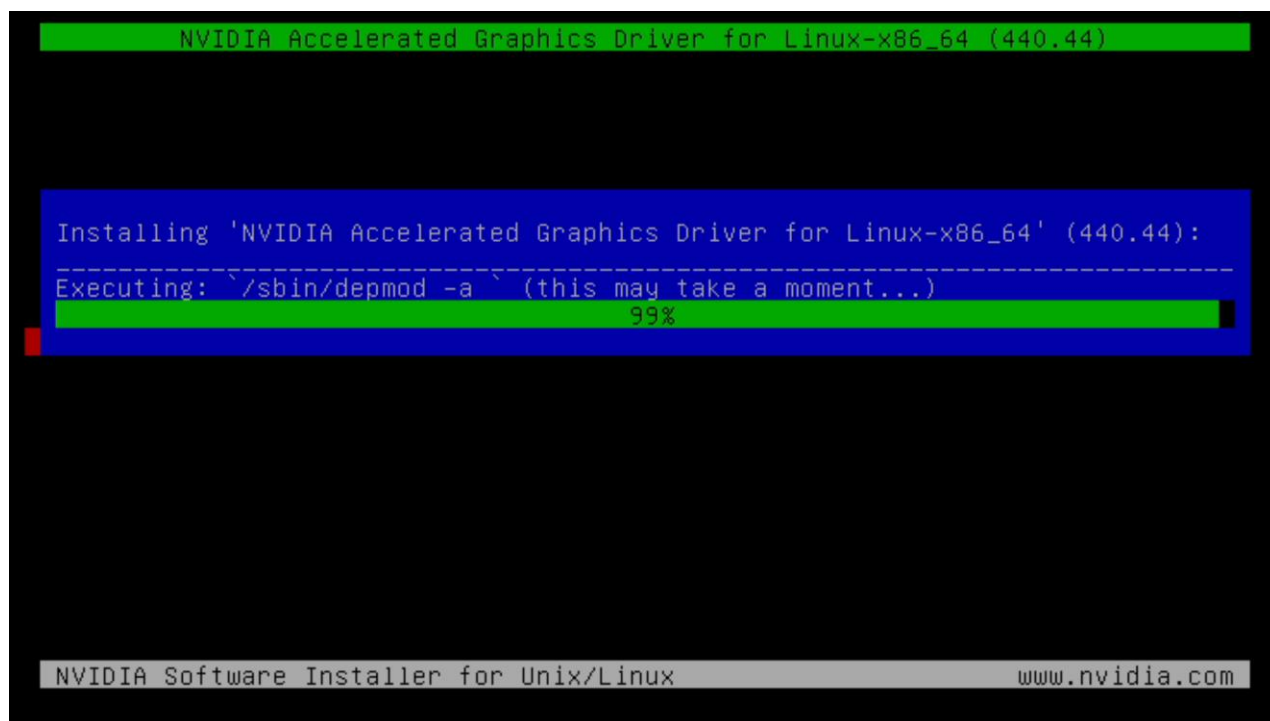


**Step 7:** Select to "Install and overwrite" libglvnd libraries.

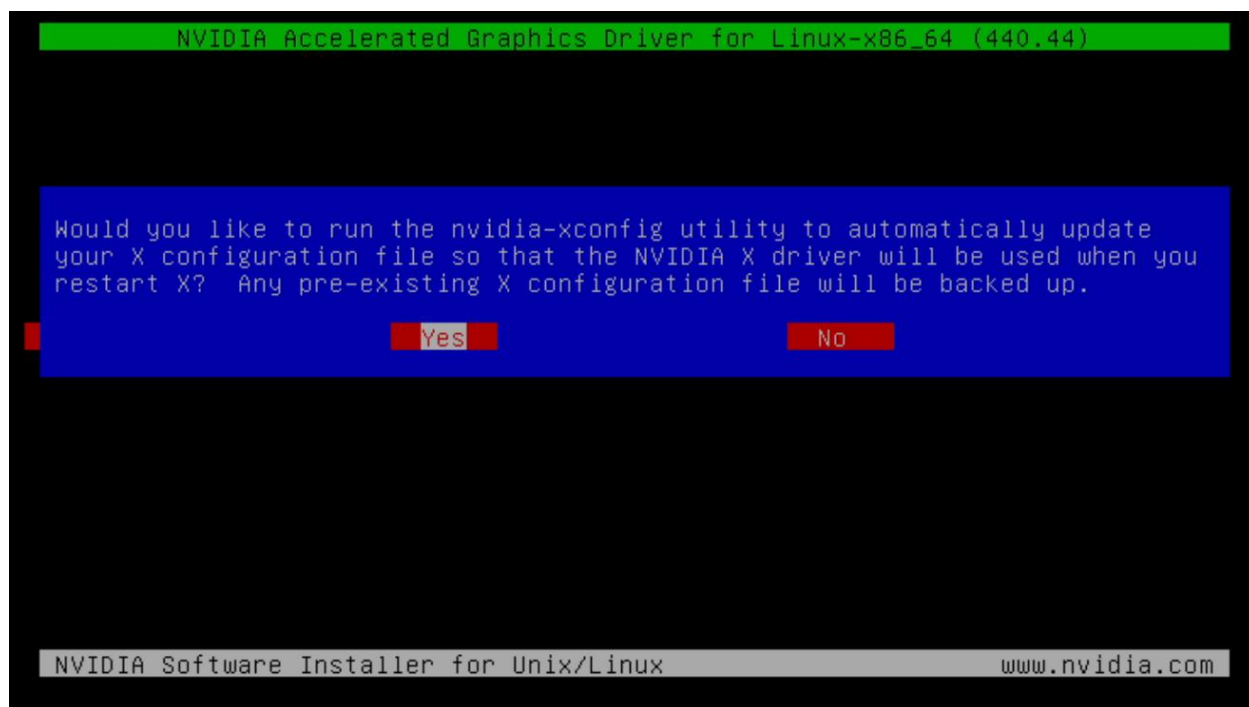




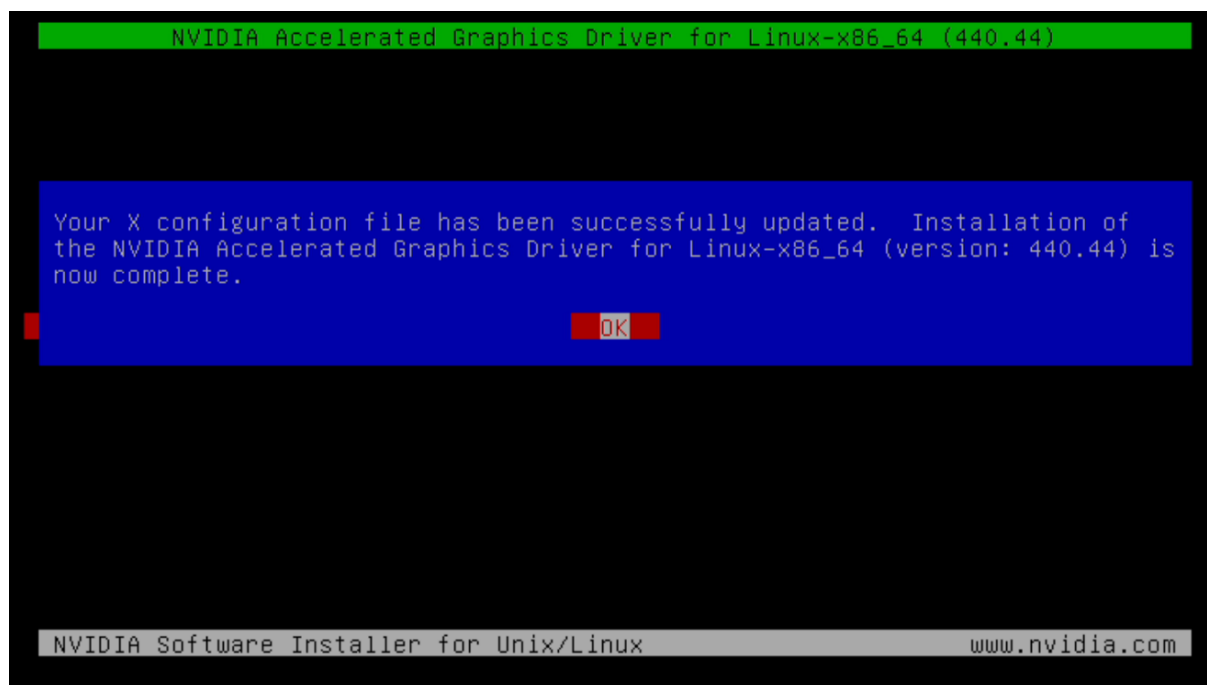
**Step 8:** Nvidia driver installing progress bar may appear.



**Step 9:** Select "Yes" to update the X-configuration file to use the Nvidia X driver.



**Step 10:** Select “OK” to acknowledge the driver installation is complete.



**Step 11:** Execute the following command to verify the Nvidia driver is loaded.

# nvidia-smi

```
root@debian:/home/lenovo/Downloads# nvidia-smi
Thu Jan  9 13:22:29 2020
```

| NVIDIA-SMI 440.44 Driver Version: 440.44 CUDA Version: 10.2 |             |               |                  |                |          |         |         |  |  |
|-------------------------------------------------------------|-------------|---------------|------------------|----------------|----------|---------|---------|--|--|
| GPU                                                         | Name        | Persistence-M | Bus-Id           | Disp.A         | Volatile | Uncorr. | ECC     |  |  |
| Fan                                                         | Temp        | Perf          | Pwr:Usage/Cap    | Memory-Usage   | GPU-Util | Compute | M.      |  |  |
| 0                                                           | Quadro P520 | Off           | 00000000:3C:00.0 | Off            |          |         | N/A     |  |  |
| N/A                                                         | 41C         | P0            | N/A / N/A        | 0MiB / 2002MiB | 1%       |         | Default |  |  |

```

Processes:
GPU      PID    Type    Process name                      GPU Memory
Usage
=====
No running processes found
root@debian:/home/lenovo/Downloads#
```

**Step 12:** Reboot the system.

---

## Section 7 – Revision History

| Version | Date       | Author    | Changes/Updates        |
|---------|------------|-----------|------------------------|
|         |            |           |                        |
| 1.0     | 12/20/2019 | Hady Asad | Initial launch release |
| 1.0.1   | 01/24/2020 | Hady Asad | Minor clarity changes  |